REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-5, 10, and 13-16 are presently active; Claims 1, 10, and 13 having been amended, Claims 8 and 12 having been presently canceled without prejudice, and Claims 15 and 16 have been added by the present amendment. No new matter has been added.[1]

In the outstanding Office Action, Claims 1-4, 8, 10, and 12-14 were rejected under 35 U.S.C. §103(b) as being unpatentable over Ushikoshi et al (U.S. Pat. No. 5,306,895) or Arena et al (U.S. Pat. No. 5,635,093) in view of Hecht et al (U.S. Pat. No. 5,877,475). Claim 5 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ushikoshi et al or Arena et al in view of Hecht et al in further in view of Yoshida et al (U.S. Pat. No. 6,080,970).

Firstly, Applicants acknowledge with appreciation the courtesy of Examiner Paik to discuss this case on June 17, 2004 during which time the outstanding issues in the final Office Action were discussed. The results of the interview are substantially summarized here below. No agreement on patentability was reached during the interview.

During the interview, Applicant's representative discussed that the feature of a sheath-type thermocouple pressed onto the bottom portion of a bottomed hole formed relatively nearer to the heating surface than the heating element provided rigidity and accuracy to the temperature measurements made on the sintered ceramic plate of the claimed ceramic heater. Such features are not shown individually or in combination with Ushikoshi et al or Arena et al or Hecht et al, as the temperature-measuring element in Hecht et al is not a sheath-type thermocouple, the temperature-measuring element in Arena et al is described as being placed between heating plates and preferably a thermocouple, and the sheath-type thermocouples

disclosed in Ushikoshi et al are fixed to the top plate 15, as shown in Figure 2 thereof. However, Examiner Paik maintained that Hecht et al showed that one of ordinary skill in the art would be motivated regardless of the character of the surface being measured to press a temperature-measuring element onto the surface to more effectively measure the heating temperature.[2]

Nevertheless, to this combination of Ushikoshi et al and Hecht et al, Applicants respectively traverse for the following reasons.

Firstly, Ushikoshi et al is directed to heaters that will operate in corrosive atmospheres without contaminating semiconductor wafers by inadvertent etching of heater parts.[3] Meanwhile, Hecht et al is directed to a radiant heater whose application, as based upon the background description, is directed to electrical cooking appliances. Regarding analogous art, M.P.E.P. §2141.01(a) quoting from *In re Clay*, 966 F.2d 656 notes that the court therein found that the inventions involved different fields of endeavors, since the reference taught the use of the gel in a different structure for a different purpose under different pressure and temperature conditions. In the present case, the heaters in Ushikoshi et al and Hecht et al involve difference fields of endeavor being used for different purposes (i.e., heaters for heating semiconductor wafers in corrosive atmospheres verses radiant heating elements for stovetop cooking) that operate in different temperature regions (300 to 1,100° C verses 0 to 506° C). Accordingly, Applicants submit that one skilled in the art of semiconductor heating apparatuses would not be motivated to utilize teachings from a radiant cooking heater reference to modify a heater in a corrosive semiconductor environment.

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[1] New Claim 15 is supported by the subject matter of Figure 2(a) and Figure 3. New Claim 16 is supported by the specification at pages 12 and 13.
[2] Office Action, page 2, line 23, to page 3, line 3.
[3] Ushikoshi et al, col. 2, lines 42-60.

Secondly, Ushikoshi et al disclose heater configurations in which both the heating elements and the temperature-measuring devices are enclosed and separate from the corrosive atmosphere, as seen in Figure 1 of Ushikoshi et al. A number of measures were undertaken by Ushikoshi et al to ensure accuracy of temperature measurement within the constraints of the enclosed heater unit. Ushikoshi et al disclose that:

> Moreover, the hollow sheath 9 made of molybdenum, etc., is not exposed to the space in the interior of the housing, so that the possibility is eliminated of being contaminated by such a heavy metal. Also, the thermocouple 10 in the hollow sheath 9 can be insulated by the cylindrical body 50C made of an inorganic insulative material. As a result, mixed contacting and induction due to a high frequency power source or a high voltage power source used in a semiconductor production apparatus can be prevented, so that measurements of more accurate temperature became possible.[4]

As such, the teachings of Hecht et al provide no simplification of the corrosive, enclosed heater assembly of Ushikoshi et al. Rather, the teachings of Hecht et al if applied to Ushikoshi et al would merely add complication without any clearly ascertainable benefit.

Indeed, Applicants respectfully submit that without knowledge of the present invention, in particularly the data presented in Table 1 regarding temperature-differences and response times for conventional ceramic heaters verses those of the present invention, one of ordinary skill in the art would not be motivated to modify the corrosive, enclosed heater assembly of Ushikoshi et al.

Furthermore, in Hecht et al, a glass ceramic is utilized. Applicants submit that a glass ceramic plate is not a sintered ceramic plate, and does not have irregular surfaces composed of pores or crystal grains. A glass ceramic plate does not have a problem that a space is formed between the temperature sensor and the irregular surface. Accordingly, one cannot predict from Hecht et al that a precise temperature measurement is enabled by pressing a

[4] Ushikoshi et al, col. 24, lines 16-26.

temperature-measuring element on the bottom portion of a bottomed hole in a sintered ceramic substrate, whose surface is irregular. Moreover, a sheath type thermocouple (as presently claimed and not disclosed in Hecht et al) provides rigidity for pressing the sheath type thermocouple on the bottom portion of the bottomed hole of the claimed sintered ceramic.

Hence, for these reasons, it is respectfully submitted that only by impermissible hindsight gained from Applicants' teaching would one of ordinary skill in the art be motivated to modify the corrosive heater of Ushikoshi et al, as asserted in the outstanding Office Action. Indeed, the court in *In re Mercier*, 185 USPQ 774 (CCPA 1975) stated that

> The board's approach amounts, in substance, to nothing more than a hindsight "reconstruction" of the claimed invention by relying on ***isolated teachings*** of the prior art without considering ***the over-all context*** within which those teachings are presented. ***Without the benefit of appellant's disclosure***, a person having ordinary skill in the art would not know what portions of the disclosure of the reference to consider and what portions to disregard as irrelevant, or misleading. See In re Wesslau, 53 CCPA 746, 353 F.2d 238, 147 USPQ 391 (1965). [emphasis added]

Thus, with the applied art of Ushikoshi et al and Hecht et al being non-analogous art and without the benefit of the Applicants' disclosure to know which parts of Hecht et al to consider relevant, Applicants respectfully submit that the combination of Ushikoshi et al and Hecht et al is improper and that Claim 1 patentably defines over the applied prior art.

Lastly with regard to Claim 1, Applicants submit that the deficiencies in Ushikoshi et al and Hecht et al are not overcome by Arena et al. As noted earlier, in Arena et al temperature-measuring element in Arena et al is described as being placed between heating plates and preferably a thermocouple.[5] There is no disclosure in Arena et al for pressing a sheath type thermocouple on the bottom portion of a bottomed hole of the a sintered ceramic. Indeed, one cannot foresee from Arena et al that, when a temperature-measuring element

contacts with a bottomed hole in a sintered ceramic substrate, a space is formed between the temperature-measuring element and a bottom portion of the bottomed hole. Thus, Applicants submit that a precise temperature measurement in Arena et al is not possible. Hence, one cannot predict from Arena et al that the above-mentioned problem can be solved by pressing the temperature-measuring element on the bottom portion.

Regarding Claim 2, as discussed during the interview, positioning the thermocouple close to the heated surface is advantageous. While Ushikoshi et al disclose that samples for corrosion testing are 2-3 mm thick, there is no disclosure in Ushikoshi et al for the thickness of the ceramic heater 2. Thus, while figures such as for example Figure 32 of Ushikoshi et al show a bottomed hole beyond a center line of the ceramic substrate 4, there is no disclosure in Ushikoshi et al as to the actual distance of the bottomed hole from the heating surface. Indeed, since M.P.E.P. § 2125 states that proportions of features in a drawing are not evidence of actual proportions when drawings are not to scale, Applicants submit that, even if for the sake of argument the ceramic substrate 4 was assumed to be 2-3 mm thick (contradicting with the disclosure in Ushikoshi et al at col. 17, lines 6-9, that the length of the caulking portion 31 b included inside the ceramic substrate 4 is itself 3 mm), then the actual position of the bottomed hole could not ***properly*** be inferred from the figures in Ushikoshi et al.

Indeed, by having the thermocouple positoned in this bottomed hole, Applicants submit that the temperature measurement can be carried out without being affected by either the atmosphere or the temperature change of the heating element. For example, as for the ceramic heater shown in the attached Fig. A, when the temperature of the heating element changes, the temperature-measuring element (i.e., the thermocouple) immediately detects the

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[5] Arena et al, col. 3, lines 55-62.

temperature change, and cannot precisely measure the temperature of the heating surface itself.

As for the ceramic heater shown in the attached Fig. B, the temperature measurement is only slightly affected by the temperature change of the heating element. Thus, the temperature-measuring element precisely measures the temperature of the heating surface.

As for the ceramic heater shown in the attached Fig. C, the temperature-measuring element is not included in the bottomed hole. In this case, one cannot measure the temperature of the heating surface precisely since temperature measurement element contacts to the opposite surface of the heating surface and also the temperature measurement is affected by the atmosphere.

Accordingly, in the present invention, a precise temperature measurement can be carried out by forming the bottom portion of the bottomed hole relatively nearer to the heating surface than the heating element and including the sheath-type thermocouple in such a bottomed hole as defined in Claim 2.

Thus, Applicants respectfully submit that there is no disclosure in Ushikoshi et al for the distance between the bottom portion of a bottomed hole and a heating surface being from 0.1 mm to ½ of the thickness of the ceramic plate, as defined in Claim 2. Further, without the knowledge gained from the present invention for the advantage of such placement, there is no motivation for one of ordinary skill in the art to modify the holes in the ceramic substrate 4 of Ushikoshi et al to have the depth defined in Claim 2. Hence, like Claim 1, Claim 2 is believed to patentably define over the applied prior art.

Finally, new Claim 16 defines a ceramic heater including a rectangular-section heating element formed inside the sintered ceramic plate and having an aspect ratio of a width to a thickness of the heating element in a range from 200 to 5000. As noted in the specification, such an aspect ratio improves the temperature uniformity on the ceramic

heating surface.[6] Applicants submit that a raeactangular-section heating element having the recited aspect ratio range is not disclosed in the applied prior art. Only Yoshida et al disclose a rectangular-section heating element, but there is no disclsoure in Yoshida et al as to the dimensions of the heating elements disclsoed therein.

Hence, Claim 16 is believed to patentably define over the applied prior art.

Consequently, in view of the present amendment and in light of the above discussions, the outstanding grounds for rejection are believed to have been overcome. The application as amended herewith is believed to be in condition for formal allowance. An early and favorable action to that effect is respectfully requested.

Respectfully Submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER, & NEUSTADT, P.C.

Gregory J. Maier
Attorney of Record
Registration No.: 25,599
Ronald A. Rudder
Registration No. 45,618

CUSTOMER NUMBER
22850

Tel.: (703) 413-3000
Fax: (703) 413-2220

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Attachments: Figures A, B, C

[6] Specification, page 12, line 33, to page 13, line 8.